



# MARSHALL STAR

Serving the Marshall Space Flight Center Community

Oct. 12, 2006

## Marshall photo analysis team works in the dark



From left, Clay Sawyer, Robert Gillis and Tom Rieckhoff work at consoles, viewing imagery from a space shuttle launch. The photo analysis team views hundreds of moving and still images during shuttle launches, looking for potential problems such as foam loss from the shuttle's external tank.

By Sanda Martel

During space shuttle launches, a team of Marshall Center experts can be found sitting in a dark room at consoles lined with four video screens. Their work, supporting NASA's Space Shuttle Program, is reviewing high-definition video and film footage that is received just moments after a shuttle clears the launch tower at the Kennedy Space Center, Fla. They are looking at images that show any change or problem with performance — from debris shedding to the color of the exhaust from solid rocket motors.

These "image detectives" are members of the Marshall Center Engineering Directorate's photographic analysis group — eight people whose specialties

**See Photo analysis on page 4**

## Former NASA flight director Gene Kranz to address Marshall employees at Safety Day on Oct. 19

By Bill Hubscher

Best-selling author and former NASA director of Mission Operations Gene Kranz will give the keynote address for this year's Marshall Center Safety Day on Thursday, Oct. 19.

Kranz served as flight director for several of the Apollo missions, including the Apollo 11 lunar landing and the successful return of the Apollo 13 crew, dramatized in the film "Apollo 13." He is also a best-selling author. His book, "Failure Is Not An Option," chronicles his work in Mission Control at the Johnson Space Center in Houston, from Project Mercury through

the Apollo era and beyond.

Safety Day activities start with "Coffee and Kranz" at Building 4316 at 8 a.m. Kranz will share his thoughts on mission success starting at 9:30 a.m. Marshall team members are encouraged to arrive early for coffee via the bus system, as parking will be unavailable. Buses start at 8 a.m.

After Kranz' presentation, Marshall supervisors will continue the MISSION: Safety discussions in each department and organization initiated in their September safety meetings. They will discuss the many challenges team members face relating to safety and mission success, and what



Gene Kranz

**See Safety Day on page 4**

## **Marshall's advanced materials research activity offers new insight, solutions**

*By Rick Smith*

In September, more than 50 Marshall researchers gathered to discuss results of a battery of innovative materials studies commissioned as part of Marshall's Advanced Materials for Exploration activity — research that could prove invaluable to NASA's continuing mission of exploration, and future journeys to the moon and beyond.

Some of the scientists are working to strengthen composites to fabricate more durable hardware, or developing novel coatings to minimize component wear. Others seek to reduce the amount of heat or cold transferred by various materials, which could help protect delicate electronics and instruments from the brutal space environment, or keep cryogenic liquid fuels at their proper deep-cold temperatures on the launch pad. Still others are pursuing new, alternative materials for everything from vehicle engines and heat shields to delicate solar sail fabrics and anti-radiation gear, hoping to improve vehicle and crew safety and deliver more robust, cost-effective science missions into the solar system.

The Advanced Materials for Exploration activity, managed for Marshall by the Science and Mission Systems Office, researched four key areas: propulsion materials, structural materials, thermal management materials and general materials characterization. The coordinated effort sought to identify materials shortfalls that limit the feasibility of long-term space missions, and to recommend alternative materials and new manufacturing solutions.

Beth Cook, project manager for the activity, hopes NASA's mission to extend a human presence across the solar system will encourage project managers to investigate practical applications of the

materials research conducted during the activity.

"What often keeps mission managers from picking new materials is a lack of verifiable data and successful testing," Cook said. "If there is an existing material on the shelf that meets specs, it's typically preferable to the novel composite or fabric or coating, which can be costly and time-consuming to develop.

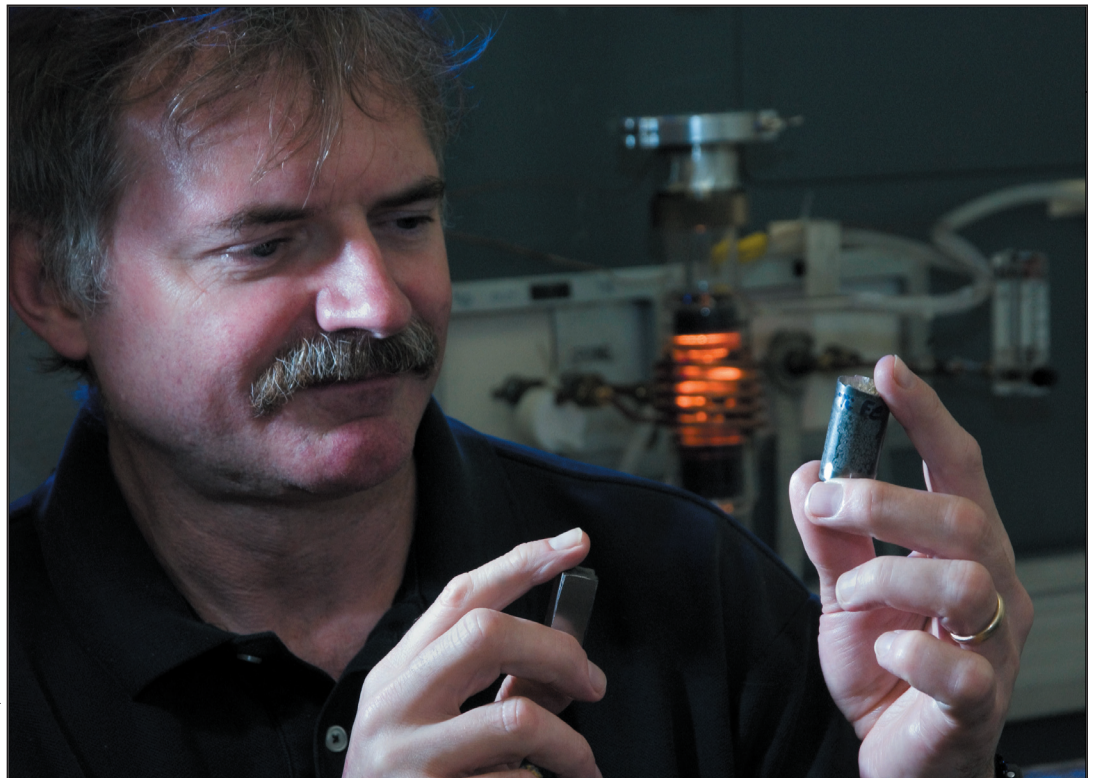
"By laying this foundation now, we're cutting down the learning curve," she added.

That foundation has given Marshall's materials research, fabrication and testing capabilities a critical boost, Cook said — one that could prove invaluable to NASA's lunar and space exploration.

"The rigors of next-generation science exploration in space demand durable materials that can sustain reliable operation well beyond the thresholds of today's materials," she said. "Our materials scientists and engineers are striving to reduce mass, widen operating temperature margins, and increase long-term durability and resilience."

They're also devising new ways to conduct materials research. The High-Temperature Emissivity Measurement System, or HiTEMS, for example, is an innovative new test facility designed by Marshall physicist Todd Schneider as part of the activity. The system measures emissivity — a material's ability to dispel or expel heat — at temperatures reaching nearly 4,900 degrees Fahrenheit. It will permit Marshall researchers to study a wider range of metals, alloys, composites and coated or painted surfaces in the future.

***See Materials on page 5***



Emmett Given/NSFC

**Marshall Center materials engineer Dr. Richard Grugel examines a high-strength metal alloy he developed to fabricate wire for use in space — part of the Advanced Materials for Exploration activity.**

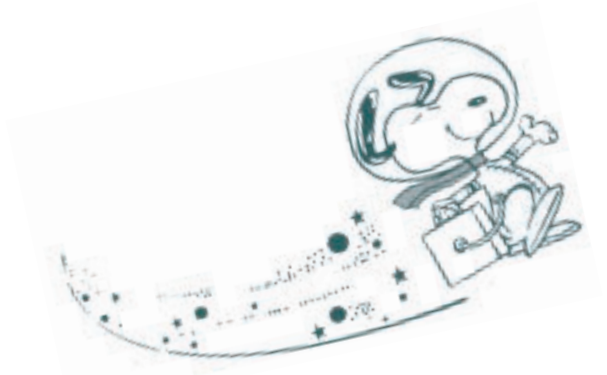


# Astronaut Tony Antonelli presents 3 Silver Snoopy Awards

Silver Snoopy Awards were presented to three Marshall team members Sept. 27 by astronaut Tony Antonelli.

The Silver Snoopy is the astronauts' personal award to members of the workforce for outstanding and exemplary work.

The Snoopy emblem reflects NASA and the industry's sense of responsibility and continuing concern for astronaut flight safety. Less than one percent of the space program workforce receives the award annually.



David Higginbotham/MSFC



From left, Chad Bryant, astronaut Tony Antonelli and Richard Sheppard. The recipients are from the Shuttle Propulsion Office.



From left, Mark Hammond of ATK Thiokol and astronaut Tony Antonelli.

## Obituaries

**Thomas Allen "T.A." Gilliam**, 76, of Huntsville died Aug. 26. He retired from the Marshall Center in 1990 as a visual information specialist. He is survived by his wife, Ruth Enzweiler Gilliam; two sons, Thomas Allen Gilliam Jr. of Huntsville and Mark Robert Gilliam of Harvest; one daughter, Kristen Leigh Gilliam of Huntsville; and one brother, Richard H. Gilliam of Huntsville.

**Henry R. "Roy" Brewer Jr.**, 82, of Huntsville died Aug. 23. He retired from the Marshall Center in 1981 as a quality assurance specialist. He is survived by his wife, Margaret Brewer; one son, John Brewer; five daughters, Rita Nelson, Joan Walls, Neysa Bufalo, Pat Heath and Beth Sanford; one stepson, Shaun Green; one stepdaughter, Misty Wilbourn; and one brother, Wayne Brewer.

## Photo analysis

### *Continued from page 1*

include mathematics, science, computer science, engineering and mass communications.

The team is one of three NASA imaging groups charged with analyzing shuttle images during flight. The other two are at the Kennedy Center and the Johnson Space Center in Houston.

The heart of the operation is scrutinizing the staggering volume of imagery that comes their way. They pore over thousands of moving and still images in the minutes, hours and days following launch, looking for evidence of any potential problems, particularly external tank foam, which could have fallen off during ascent.

The space shuttle external tank is covered with spray-on foam insulation, a component of the tank's thermal protection system that insulates the tank before and during launch.

Tom Rieckhoff, who leads the group, has analyzed photos from almost every shuttle flight for the past 20 years. His team loads the reviewed images into a computer system and makes them available on the Web to engineers and managers within the NASA family.

"We saw foam come off the external tank ice/frost ramps during both the STS-121 and STS-115 missions (in July and September 2006, respectively) and reported that immediately up through the management chain," Rieckhoff said.

"We can analyze what we see to provide foam liberation time; calculate size and velocity; and, if the photographs are good enough, determine the depth of the lost foam pieces," he added. "After we analyze the images, we send the data to the program and they determine if what we saw on the images could impact the mission."

External tank foam losses that occurred during both shuttle missions in 2006 were within allowable limits, did not impact the orbiter, or happened late into flight, well after 135 seconds when atmospheric conditions allow the debris to pose no danger to the vehicle. Shuttle program officials have said that some foam loss from the ice/frost ramps is to be expected, but engineers are considering the feasibility of an ice/frost ramp redesign.

The Marshall Center is responsible for viewing imagery from 106

still and video cameras installed at the Kennedy Center which record and track shuttle launches until the orbiter reaches space. Imagery from cameras attached to the orbiter, external tank and solid rocket boosters, as well as airborne camera assets, also is reviewed.

"During the last several years, NASA has really expanded and improved the photo analysis program," said Rieckhoff. "Digital imagery has replaced videotapes, and high-definition monitors have replaced old television tubes."

New and modified cameras on the shuttle's solid rocket boosters, and an external tank camera placed to view the orbiter underside and forward attach point, have enhanced

monitoring. The tank-mounted camera transmits views to the ground in real time via the ground communications station at Merritt Island, Fla., during the shuttle's climb to orbit. The solid rocket booster cameras do not provide real-time views during launch, but record imagery for

playback after their retrieval from the Atlantic Ocean, following the booster separation from the shuttle. Astronauts' hand-held cameras and a digital still camera inside the orbiter also take pictures of the external tank after it separates from the shuttle. These are transmitted to the ground within a few hours of launch.

In all, it takes the imaging group about four days to review all films and videos from the launch. The analysts remain in the dark hour after hour, looking at imagery most people never see.

Despite all the technology that makes the photo imaging group's task easier, there's no computer program to make potential problems jump out of the images. People have to look at the videos and films — once and again, forward and backward, fast and slow.

"It takes a little discipline to stay focused," said Rieckhoff. "There's no horseplay, and we don't let visitors in. It's pretty serious in here."

Rieckhoff said the imaging analysis group expects to transition into supporting new program requirements once the space shuttle is retired in 2010. "We are ready to support any test flights and move on to the new program," he said.

*The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.*

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## Safety Day

### *Continued from page 1*

can be done to improve in those areas.

Conclusions should be posted to the Safety Day Web site, <http://safetyday.msfc.nasa.gov>, by 1 p.m.

Topics from those posted on the site will be selected for a panel discussion, led by Marshall senior managers, during the "Supervisor's Safety Forum" in Morris Auditorium in Building 4200 from 2:30 to 3:30 p.m.

For more information on Safety Day, including the bus schedule to the keynote address, visit the Safety Day Web site.

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# Army Missile Command's Dr. Virginia Young to speak at NSSTC on Oct. 19

By Rick Smith

Robotics expert Dr. Virginia "Suzy" Young, director of the U.S. Army Aviation and Missile Command's Advanced Science and Technology Directorate at Redstone Arsenal, will speak Oct. 19 at the National Space Science and Technology Center in Huntsville. The talk is part of the center's Distinguished Lecturer Series.

Young will speak at 11 a.m. in NSSTC Room 4078 about robotics, automation and transitioning technologies among NASA, industry and the military. It is free and open to employees and contractors at the NSSTC and the Marshall Center, commercial partners and university students and instructors.

As director of advanced science and technology for the Army Missile Command's Research, Development and Engineering Center, Young leads development of technology innovations to meet emerging Army requirements, and oversees the integration of new technologies into Army systems.

Young also is an adjunct professor in the Computer and Electrical Engineering Department at Vanderbilt University in Nashville, Tenn.

She joined the U.S. Army Missile Command in 1982 as a robotics

engineer. As manager of the first anti-armor robotics program, she led initial development and testing of the first military armed robot for the U.S. Army Infantry School in Ft. Benning, Ga.

Young has a bachelor's degree in engineering from the University of Memphis in Tennessee and a master's in business administration from the Florida Institute of Technology in Melbourne. She earned a second master's degree and a doctorate in computer and electrical engineering from Vanderbilt University.

The Distinguished Lecturer Series, hosted monthly by the NSSTC and its participating organizations, brings speakers to Huntsville from industry, academia, private research facilities and government agencies around the nation. Future speakers will address topics ranging from global weather systems, NASA's lunar science and exploration mission, and new efforts to study the sun-Earth environment.

For more information, call the NSSTC at 961-7000.

*The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.*



Dr. Suzy Young

## Materials

### *Continued from page 2*

Other scientists studied ways to combine materials for added strength and durability. Marshall researcher Frank Zimmerman, for instance, studied diffusion bonding and vacuum plasma spray, two processes for applying protective coatings to hardware materials. He tested the processes on two materials, molybdenum-40Re alloy and 100-percent rhenium. Both are "refractory" materials, able to withstand the effects of sustained high temperatures, and are used in a variety of space hardware fabrication applications.

"Differences in materials' physical properties can result in mechanical strain or metallurgical instability," Zimmerman said. "New and improved processing techniques will reduce or

eliminate these causes of failure."

Still other scientists launched research activities slated to continue well beyond this coordinated effort. Marshall scientist Miria Finckenor selected key materials for the next Materials on International Space Station Experiment, or MISSE, an ongoing research series that identifies durable candidate materials for future space applications and subjects them to direct space exposure on and outside the space station.

Finckenor, the experiment's principal investigator, selected a variety of fabrics, wires and coatings for the upcoming sixth materials experiment on the space station. She also included a deployable, scale-model "ballute" — a unique aerocapture system, part balloon, part parachute. This research, she said, could lay the groundwork for further development of this innovative

means of inserting vehicles into planetary atmospheres. MISSE-6 currently is slated to fly to the space station no earlier than STS-118 in June 2007, and a seventh payload already is being planned, Finckenor said. She hopes the successful series eventually will continue on the surface of the moon, where long-duration materials exposure and testing could help answer the particular materials needs of future generations of lunar explorers.

For more information about the Advanced Materials for Exploration activity, visit <http://ame.msfc.nasa.gov> before Oct. 31, or e-mail Twila Schneider, activity task coordinator, at [twila.g.schneider@nasa.gov](mailto:twila.g.schneider@nasa.gov).

*The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.*

# NASA Exchange nut sale pre-orders under way

The NASA Exchange is offering Marshall team members and retirees the opportunity to purchase nuts through pre-orders. Orders will be accepted through Oct. 17. Expected delivery date is Nov. 15.

The order form should be completed and mailed or delivered, along with payment, to the NASA Exchange Space Shop, Attn: Teresa Davis, HS01X, Bldg. 4203, Marshall Space Flight Center, AL 35812.



*Marshall Exchange*

## "NASA EXCHANGE ANNUAL NUT SALE"

### Order Form

NAME: \_\_\_\_\_ Office Symbol: \_\_\_\_\_

Office Phone: \_\_\_\_\_ Email Address: \_\_\_\_\_

#### SPECIFY QUANTITY AND TOTAL PRICE

Product (16 oz. Unless noted):	QUANTITY	TOTAL PRICE
Slivered Almonds (11 oz.) @ \$5.25	_____	\$ _____
Cashews @ \$5.75	_____	\$ _____
Chocolate Covered Pecans @ \$7.25	_____	\$ _____
Crunchy Praline Pecans @ \$7.25	_____	\$ _____
English Walnuts @ \$4.75	_____	\$ _____
Natural Almonds (12 oz.) @ \$5.25	_____	\$ _____
Pecan Halves @ \$7.00	_____	\$ _____
Pistachios @ \$5.75	_____	\$ _____
Raw Peanuts @ \$2.00	_____	\$ _____
Roasted & Salted Pecans @ \$7.25	_____	\$ _____
White Chocolate Pecans @ \$7.25	_____	\$ _____
<b>Totals</b>		<b>\$ _____</b>

\*\*\*\*PAYMENT MUST ACCOMPANY ORDER\*\*\*\*

Make Checks Payable to: NASA Exchange - MSFC

DEADLINE FOR ORDERING IS: October 17, 2006 to ensure delivery before Thanksgiving.

PLEASE MAIL CHECK & ORDER TO: HS01X, ATTN: TERESA DAVIS, NASA EXCHANGE SPACE SHOP, BLDG. 4203, Huntsville, AL 35812. Payment may be made by Cash, VISA, MasterCard, Discover, or American Express by taking your order form to the NASA Exchange Space Shop located in Building 4203.

Received by: \_\_\_\_\_ Date: \_\_\_\_\_



## NSSTC Executive Director Martin Kress to address AIAA on Thursday, Oct. 19

Martin Kress, executive director of the National Space Science and Technology Center, will be the featured speaker at the American Institute of Aeronautics and Astronautics, Alabama-Mississippi Section dinner meeting on Thursday, Oct. 19. Kress will discuss current and planned work at the NSSTC and share plans for the creation of the new Von Braun Center for Science and Innovation.

The dinner meeting will be held at the Holiday Inn Research Park, next to Madison Square Mall. A social will begin at 6:30 p.m., with dinner at 7 p.m. The cost of dinner is \$20 per person. To make a reservation, contact Mike Tinker, AIAA vice chair and programs director, at [mike.tinker@nasa.gov](mailto:mike.tinker@nasa.gov) or 544-4973.

Reservations and cancellations must be received by noon on Monday, Oct. 16.



Marty Kress

## Classified Ads

*To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue is 4:30 p.m. Thursday.*

### Miscellaneous

Solid Cherry sleigh daybed w/trundle bed, \$300. 536-6345  
Golf clubs, men's left-handed: woods 1-3-5, irons 3-9, PW, SW, putter, no bag, \$125. 882-3983  
Full bed, \$100; twin bed, \$100; computer desk, \$50; sofa, \$100; student desk, \$50. 534-0939  
Swivel recliner removed from motor home, \$50. 729-8020  
Pioneer DV-563A DVD, DVD audio, and SACD player, original box, remote and manual included, \$100. 256-457-1196  
Car-top sport carrier, 20-SV, 20 cu. ft., \$100. 684-6271  
Kenmore frost-free upright freezer, 12.6 cu. ft., \$175. 325-7201  
Antiques: Victorian couch, \$2,500; 6 chairs w/embroidered seats, \$500; oak pedestal table, \$500. 551-0276  
Jornada pocket PC, all software, user guide, modem, cords, \$200. 256-971-0499  
Pool table, 8', Kasson-Auburn, fruitwood, Queen Anne feet, leather pockets, all accessories, \$2,500. 880-6563  
Cell phone Z500 Sony w/accessories, \$43; cable modem, 3Com for Internet, \$25. 655-1986  
Ridgeway 7' Grandfather clock w/chimes, Oak finish, \$50. 468-6016  
TV, 26", \$50; small white microwave, \$35; Weedeater, 17", \$35; air conditioner, 8500 BTU, \$25. 883-8632  
Meade Starfinder telescope, 12.5", numerous upgrades and extra items included, \$900. 883-9361

Fisher VCR Plus w/original remote, \$10; Cherry wood floor mirror, pivots in frame, \$10. 479-6073  
Pop-up camper, Jayco Dove 8, a/c, sleeps 6, \$900. 379-3606  
Beagle puppies, 9 weeks old, first shots, wormed, \$60. 256-734-8006  
Older model single-wide mobile home to be removed from property, 2 bedrooms, 1 bath, \$2,000. 256-751-0999  
Three Goodyear Eagle LS 205/55-126 tires, 75 tread remaining, \$100. 656-4203  
1996 Cavalier mobile home, to be moved, 16'x72', 2 bedrooms, 2 baths, w/upgrades, \$17,800. 256-289-6266  
Oak entertainment center w/recessed lights, adjustable shelves, storage, holds up to 36" TV, \$500. 829-0285  
Bruce hardwood flooring, approx. 120 sq. ft., Butterscotch color, 3/4" nail down, \$200. 895-9589  
Dell Axim X-30 PDA, 312Mhz, Bluetooth/WiFi w/cradle and software, \$100. 337-4359  
Shopsmith Mark V woodworking machine w/4" jointer, dado and other extras, \$1,200. 256-874-7313/Clint  
Antique floor model radio cabinet, \$50. 534-4968  
Broyhill sofa and matching chair, \$250. 256-694-1217  
Black metal desk, laminate wood top, 30"Dx60"Wx29"H, \$40. 882-0133  
Concrete steps, 4 steps high, \$65. 256-350-5836  
Diamond solitaire ring, 1/2-carat, \$1,100; Mag-wheels, Niche Spikes, 17", Kumho tires, 75 tread left, \$350. 256-468-4107

### Vehicles

1998 Maxima, one-owner, all-options, auto, sunroof, maintenance records, \$5,250. 527-8116  
1998 Cadillac Eldorado, red, 2-door, power sunroof, touring package, 58K miles, \$11,000. 885-2293  
1992 Lincoln Town Car, bad motor, \$800. 655-8166  
1996 Buick Century, gray, 4-door, 56K miles, \$2,500. 256-837-6296/leave message  
Motorcycle, 200 Victory Model V92CSE, \$8,500. 256-722-8064

1978 Harley Sportster, 75th Anniversary Edition, original, low miles, turn key bike, saddle bags, etc. 256-682-9088  
1998 Dodge Ram Magnum extra-cab, 4-wheel drive, new tires, bedliner, 84K miles, \$10,500. 216-8868  
2004 Toyota Tundra double-cab, towing package, tonneau cover, running boards, Line-X, LE rims, \$21,000. 714-3742  
1998 Honda Accord sedan, auto, 165K miles, \$4,000. 837-9139  
1999 Honda CR-V EX, auto, silver, 89K miles, 4WD, many accessories, garaged, \$9,000. 850-4185  
2004 Honda Civic EX, 5-speed, 2-door, 28K miles, gray, power moonroof, \$13,800. 256-864-2616/leave message  
1991 BMW 318i coupe, red, manual transmission, E30 body style, 138K miles, \$2,200. 534-9678  
2001 Lexus LS430, 76K miles, warranty, \$28,900. 348-1809  
1977 Yamaha XS750-2D Maroon motorcycle, parts bike, \$1,000. 256-874-7313  
Kubota M49 tractor, 60 hours, \$15,000. 256-784-5299  
1983 Honda 200 ATC 3-wheeler, \$350; 1982 Honda ATC 110, 3-wheeler, \$350. 534-8414  
2003 Lincoln Town Car, white w/beige leather seats, 45K miles, \$16,500. 881-3714  
2002 Chevy Tahoe LS, white, 4WD, V8, automatic, all-power, 45K miles, \$17,000. 852-6548  
2002 Prowler camper, fifth wheel w/slide-out, sleeps 8, kitchen, bath, heat, a/c, \$17,500. 721-1260  
1986 Dodge Power Ram, rebuilt 360/V8 transmission w/shift kit, 4WD, new rims/tires, exhaust, \$1,650. 256-226-1701  
2004 Ford F150 Crew Cab, 35K miles, fiberglass camper shell, \$19,500. 683-6433

### Wanted

Black smooth top slide-in range. 256-658-0987

### Free

Puppies to good homes, mixed breed, first shots, 7-weeks old. 837-1095

## Marshall employees observe Breast Cancer Awareness month



Pink ribbon pins, balloons and treats were in abundance Tuesday, Oct. 5 – signs of the Marshall Center's annual Breast Cancer Awareness Pink Ribbon Event held in the Building 4200 lobby. The spirited and informative event featured vendor exhibits from local medical and health organizations stressing the importance of early breast cancer detection and educating employees on available pre- and post-treatment services.

At left, Marshall employees learned firsthand about the many options available for managing the cancer treatment process.

At right, keynote speaker Dr. Linda Riley, an associate professor in the College of Nursing at the University of Alabama in Huntsville, shared her experience as a breast cancer survivor and how she found opportunity within her crisis to defeat the disease.



Emmett Given/MSFC

## MARSHALL STAR

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